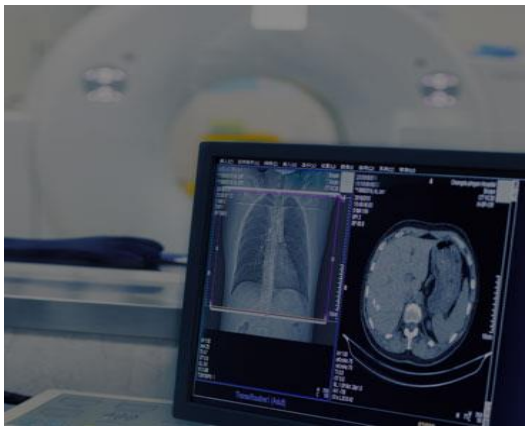
CASE STUDY

OPTOELECTRONIC INTERCONNECTS IN THE OPERATING ROOM

The Customer's Challenge

In the operating room, equipment failure is a matter of life and death, so reliability and performance are absolutely critical for medical device applications. There is no room for error due to electromagnetic interference (EMI), which is a concern with the wide range of equipment in the operating room, as the imaging and data integrity is of utmost importance to the surgical team. A compounding challenge for video equipment in operating rooms is that the video links often must run through boom arms with a 360° range of motion – a challenge for multiple copper wires or multiple fibers. Major medical equipment manufacturers have been turning to Inneos' embedded optical modules for over 10 years in order to provide a single fiber, EMI-immune, high-reliability optical interconnect solution for high-speed data and high-resolution video.



The Design Solution

A medical equipment manufacturer was looking for an optical interconnect solution for high-speed data and high-resolution video links; however, standard Datacom transceivers generally have just one channel available per fiber, which either limits the available bandwidth or requires multiple fibers, making it difficult and expensive to achieve the 360° range-of-motion within a mounting arm in the operating room. Inneos' embedded optical modules offered an ideal solution, as they use coarse wavelength division multiplexing (CWDM) to simultaneously provide multiple channels at different wavelengths over just one fiber.

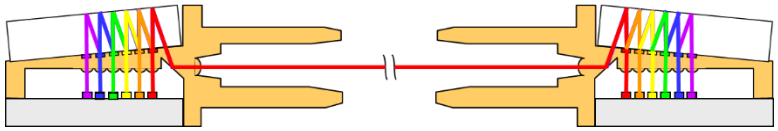


Figure 1 - Inneos' CWDM Optic uses just one fiber

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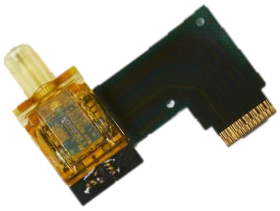

The SX51 embedded optical subassembly provided four high-speed unidirectional channels along with a lower-speed bi-directional data link to support the DVI and HDMI video as well as communication and control interfacing for the integrated controller modules being developed by the medical equipment manufacturer. This combination of unidirectional high-speed data and low-speed bi-directional data configuration was ideal for the video applications, where each of the video channels are transmitted via the unidirectional data lanes and the communication and control uses the bi-directional link.

The SX51 embedded optical subassembly had the SC optical connector receptacle integrated into the device and the electrical-to-optical conversion was all handled within the subassembly, so no optical design work was required for the manufacturer to integrate the devices into their systems. The optical subassembly was designed to fit within both mounted rack systems and external media converter devices, with its small, compact flex circuit design. Using the Inneos SX51 modules allowed the equipment manufacturer to reduce the time to market of the optical design, as they relied on Inneos' design expertise for the optical link, knowing that Inneos' commitment to quality and reliability met the stringent requirements and certifications of their medical customers.

The Results

The medical equipment manufacturer has deployed the Inneos embedded optical subsystems to provide high-performance fiber solutions as part of a number of video and data system solutions enabling the modern operating room with high-resolution video and connected equipment. Inneos has shipped over 10,000 modules per year to medical device manufacturers and understands the importance of quality in these critical components for life-saving, high-performance medical applications.

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